

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number
WO 2005/003380 A1

(51) International Patent Classification⁷: C12Q 1/68,
C12N 15/12, G01N 33/52

(21) International Application Number:
PCT/AU2004/000894

(22) International Filing Date: 2 July 2004 (02.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2003903417 4 July 2003 (04.07.2003) AU

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2005/003380 A1

(54) Title: METHODS FOR DETECTING ANEUPLOIDY USING MICROPARTICLE MULTIPLEX DETECTION

(57) Abstract: The present invention provides a method for the detection and sorting of microparticles in a mixture of microparticles. The method of the present invention allows for the detection and sorting of many distinct microparticle classes. Detection and sorting is on the basis of microparticle size, the fluorescence spectrum of any attached reporter molecule, the fluorescence intensity of the reporter molecule, and the number of particles in each classification bin. These microparticle classes have particular applications in many genetic or biochemical multiplexing studies and especially as binding agents for the detection of aneuploidy in an organism or embryo of the organism. In humans, the detection and sorting of at least 24 classes of microparticles would be sufficient for a single tube method for the simultaneous detection of aneuploidy in all chromosomes, wherein each distinct microparticle class comprises a polynucleotide sequence complementary to, and specific for, a polynucleotide sequence that is unique to a particular human chromosome. Furthermore, using currently available technology, the present method has application for the simultaneous detection of aneuploidy in all chromosomes for an organism that has 216 or fewer pairs of chromosomes. Kits for the simultaneous detection of aneuploidy in one or more human chromosomes are also provided.